REMARKS

Claims 1-27 and 32-52 will be pending upon entry of the present amendment. Claims 1-27 and 32-44 have been amended. Claims 28-31 are cancelled and new claims 45-52 are herewith submitted.

Applicants thank the Examiner for indicating the allowability of claims 14-17, 20-24, and 34-44.

Claims 2-12, 14-24, 26, 27, 32, 33, and 35-44 have been amended to correct a grammatical error in each of the preambles thereof. These amendments do not affect the scopes of the respective claims, nor are they made to overcome art or for other reasons of patentability. The claims of Group I having been elected in response to a recent Restriction Requirement, claims 28-31 are herewith cancelled. Claims 32 and 33, previously depending from claim 26, have been amended to depend from new claim 48, which is a claim directed to a method of operation. In the event the Examiner chooses to withdraw claim 48 and its dependent claims, applicants note that claim 50 includes a means-plus-function limitation, and serves as a linking claim between the apparatus claims of the present application and the method claim 48. Accordingly, in the event claim 50 is found allowable, applicants respectfully request rejoinder of claim 48, together with its dependent claims.

The Examiner has rejected claims 1-12 and 25-37 under 35 U.S.C. § 103(a) as being unpatentable over Shaw et al. (U.S. Patent No. 5,610,335, hereafter "Shaw '335") in view of Shaw et al. (U.S. Patent No. 5,847,454, hereafter "Shaw '454"). Claims 13, 18, and 19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Shaw '335 in view of Shaw '454, and further in view of Mizukoshi (U.S. Patent No. 5,503,017, hereafter "Mizukoshi").

Claim 1 has been amended to recite, in part, "a remaining sacrificial layer between the first portion of the beam and the substrate." Applicants call the Examiner's attention to Figures 1 and 2B of the present application. Figure 1 shows a beam 28 positioned within a trench 18 with a portion thereof coupled to the substrate 20. Referring now to Figure 2B, a cross-section is shown in which the connection between the beam and the substrate is illustrated. It may be seen in Figure 2B that a portion of a sacrificial layer 26 is positioned between the beam and the substrate. While claim 1 is not limited to the embodiment illustrated, there is clear support provided for the amendment thereof.

Neither Shaw '335 nor Shaw '454 teach or suggest a sacrificial layer as recited in claim 1. Referring to Shaw '335, Figures 1-5, a process for manufacturing an accelerometer is illustrated. It may be seen that the beam 42 is formed from the material of substrate 10, and a portion thereof remains integral with the substrate 10. Accordingly, there is no suggestion that an intervening layer of any kind is interposed between the beam structure and the substrate layer. The Examiner has cited Figure 17 of Shaw '335 in rejecting claim 1. Shaw '335 states "The fabrication process described above can also be used for making a torsional motion sensor such as that illustrated in Figure 17" (column 13, lines 18-20). Clearly, the manufacturing process described with reference to Figures 1-5 is the same process taught for the manufacture of the sensor of Figure 17. Thus, Shaw '335 fails to teach or suggest the remaining sacrificial layer of Figure 1.

Referring now to Shaw '454, Figures 1A-1J illustrate a process for manufacturing the sensor of Shaw '454. While these figures offer more detail than Figures 1-5 of Shaw '335, a comparison will show that the process taught is substantially identical. All of the embodiments of Shaw '454 share the same basic manufacturing process, in which a beam, or other released structure, is formed from the material of the substrate, without any intervening layers. Clearly, Shaw '454 also fails to teach or suggest the remaining sacrificial layer of claim 1. Accordingly, claim 1, together with dependent claims 2-12, is allowable over Shaw '335 and Shaw '454, either individually, or as a combination.

Claim 13 has been amended to recite, in part, "...the first beam being rigidly connected at a first portion thereof to the substrate...and...the second beam being rigidly connected at a first portion thereof to the substrate...." In rejecting claim 13, the Examiner acknowledges that Shaw '335 and Shaw '454 fail to teach the first and second trenches and the first and second beams of claim 13. The Examiner relies on Mizukoshi to provide this teaching. Referring to the cited Figure 4 of Mizukoshi, it may be seen that the electrodes 4011 and 4012, cited by the Examiner as being analogous to the first and second beams of claim 13, are unitary with the weight 405, and configured to move with the weight as a single unit.

For example, Mizukoshi states, "When the SAS 400 shown in Figure 4 is subjected to an acceleration acting in the direction of the double headed arrow 410, the movable gate electrodes 4011 to 4014, together with the cantilevers 406 and the weight 405, are displaced

to allow the acceleration in the direction of the arrow 410 to be detected..." (column 5, lines 13-18). No portion of Mizukoshi's electrodes 4011 and 4012 are rigidly connected to the substrate 402, but are instead wholly movable, with respect to the substrate.

Clearly, Mizukoshi fails to teach either first or second beams rigidly connected at first portions thereof to a substrate. Because Mizukoshi teaches the cantilevers 4011 and 4012 as being coupled to, and movable with, a weight 405, it would be inappropriate to combine the teachings of Shaw '454 with Mizukoshi to suggest first and second beams, each having a portion rigidly connected to the substrate. Such a combination would change the operating principle of the resulting structure, and would also render it unsatisfactory for its intended use. Finally, neither Shaw '335 nor Shaw '454 offers any motivation for a combination with Mizukoshi of a nature that would result in a structure such as that recited in claim 13. For example, neither reference offers a suggestion that there are any advantages to be gained by incorporating first and second trenches or first and second beams as recited in claim 13. For at least the reasons cited above, claim 13 is allowable over the cited art. Dependent claims 14-24, 45, and 46 are also therefore allowable as depending from an allowable base claim.

Claim 25 has been amended to recite, in part, "...the semiconductor circuit configured to detect electrical contact between the beam and the trench." None of the art cited by the Examiner teaches or suggests this limitation of claim 25. On the contrary, each of the references cited teaches away from such a limitation. For example, Shaw '335 is directed to capacitive sensors, as is evidenced by the following statements: "...whereby relative movement can be detected by the capacitance between opposed surfaces" (column 3, lines 29 and 30); "Capacitance-based accelerometers are fabricated, in accordance with the present invention..." (column 4, line 32); and "this motion results in a variable capacitance which can be determined by measuring changes in the output voltage..." (column 8, lines 50-53). Thus, there would be no motivation, in such an application, to provide a circuit configured to detect electrical contact, since such contact would destroy the capacitive effects being measured by the respective sensor. Shaw '335 offers no teaching or suggestion of a circuit such as that recited in claim 25.

For its part, Shaw '454 makes frequent reference to the capacitive nature of its sensors. In particular, note the paragraph beginning at column 8, line 5, and the paragraph beginning at column 14, line 6. It will be clear from a review of these excerpts, as well as other

portions of the text, that Shaw '454 is directed to sensors having capacitive coupling as a detection means. Clearly, there is no motivation to incorporate a circuit such as that recited in claim 25, since such contacts are to be avoided in capacitive type sensors.

There is no teaching or suggestion in either reference of a circuit "configured to detect electrical contact between the beam and the trench," as recited in claim 25. Accordingly, claim 25, together with dependent claims 26 and 27, is allowable over the cited references.

New claims 45-52 are fully supported by the specification. In particular, support may be found in the paragraph beginning on page 6, line 25, and the paragraph beginning on page 12, line 15.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited. In the event the Examiner finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact applicants' undersigned representative at (206) 622-4900 in order to expeditiously resolve prosecution of this application.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,

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